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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/049,188	02/08/2002	Tomoaki Yoshida	Q63028	8127

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WASHINGTON, DC 20037

EXAMINER
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CANTELMO, GREGG

ART UNIT	PAPER NUMBER
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1745

MAIL DATE	DELIVERY MODE
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06/18/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/049,188	<b>Applicant(s)</b> YOSHIDA ET AL.	
	<b>Examiner</b> Gregg Cantelmo	<b>Art Unit</b> 1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 09 April 2007.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1,17-22 and 27-30 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,17-22 and 27-30 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

**DETAILED ACTION**

***Response to Amendment***

1. In response to the amendment received April 9, 2007:
  - a. Claims 1, 17-22 and 27-30 are pending;
  - b. The previous 112 rejection stands as applied to claim 29;
  - c. The new grounds of rejection are presented in light of Applicant's broadening of the claimed invention.

***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 29 and 30 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The amended claims recite a diameter range of 100-300 nm however there is no such support for this particular range. Rather it would appear from the original disclosure that the range should in fact be 10nm-100nm.

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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Claims 29 and 30 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The amended claims recite a diameter range of 100-300 nm however it would appear from the original disclosure that the range should in fact be 10nm-100nm.

Clarification is respectfully requested.

***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1, 17, 18, 21-22 and 27-30 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent No. 6,780,388 (Masuko).

Masuko discloses a fuel cell and membrane electrode assembly (MEA) wherein the MEA comprises an electrolyte membrane, an electrode including a catalyst layer and gas diffusion layer with the electrodes being provide on each surface of the electrolyte membrane wherein at least a portion of the gas diffusion layers are in contact with the catalyst layers (see Fig. 2). Each gas diffusion layer includes a hydrophobic resin (polytetrafluoroethylene, col. 11, ll. 1-10) and carbon fibers. The carbon fibers are vapor grown carbon fibers (VGCF) which are heated to temperatures above 2000°C

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(col. 9, ll. 50-60 and col. 10, ll. 23-32) and have the same diameter and length as recited in the independent claims, notably the diameter of the VGCF is in a range from 20nm-300nm and has a diameter of less than 100 micrometers (col. 9, ll. 24-36). Thus the 3 (applied to claims 1, 17, 21, 22 and 29). Separators 11 sandwich the MEA (Fig. 1 as applied to claim 29). The catalyst layer, including the boundary between the catalyst layer and gas diffusion layer includes conductive particles such as carbon black which is applied to the electrodes in the form of a paste. Since the gas diffusion electrode is porous, at least a portion of the catalyst paste will penetrate the boundary between the gas diffusion layers and catalyst paste layers (col. 8, ll. 20-30 and Examples as applied to claims 18 and 21). Example 4 discloses a fuel cell electrode having both VGCF and PTFE wherein the mass ratio of the two is within the extremely broad claimed range of 1-95 mass % (as applied to claim 22). Masuko further discloses a method of coating a porous substrate with a composition including carbon black powder particles, PTFE resin and VGCF fibers having the claimed dimensions as discussed above (see Example 4 as applied to claim 28).

The resin is polytetrafluoroethylene (abstract as applied to claim 27).

The arrangement is provided in a fuel cell stack and thus comprises layering at least 2 cells together (col. 2, ll. 50-60 as applied to claim 30).

2. Claims 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Masuko as applied to claims 17 and 18 above, and further in view of U.S. patent No. 5,861,222 (Fischer).

The difference not yet discussed is of the spaces arrangements of claims 19-20.

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Fischer discloses of a gas diffusion layer comprising a bimodal pore distribution and wherein the total porosity of more than 40% to less than 75% is composed of small pores with an average diameter of up to 0.5 microns and large pores with an average diameter of 1 to 20 microns.

The motivation for providing the porosity of Fischer to the gas diffusion layer of EP '638 is that it enhances the diffusive characteristics of the gas diffusion layer while maintaining adequate mechanical strength to the layer.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Masuko by providing the porosity of Fischer to the gas diffusion layer of Masuko since it would have enhanced the diffusive characteristics of the gas diffusion layer while maintained adequate mechanical strength to the layer.

### ***Response to Arguments***

6. Applicant's arguments have been considered but are moot in view of the new ground(s) of rejection.

An updated search reveals that Masuko clearly teaches the same claimed carbon fibers as recited by the claims of the instant application. Therefore the claimed fibrous carbon is not held to be a novel contribution to the art nor is the combined limitations of the pending claims since these features are either anticipated or rendered obvious over the prior art rejections set forth above.

### ***Conclusion***

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7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gregg Cantelmo whose telephone number is 571-272-1283. The examiner can normally be reached on Monday to Thursday, 8:00-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

  
gc  
June 13, 2007

Gregg Cantelmo  
Primary Examiner  
Art Unit 1745